ABSTRACT

Uniform oxynitride and nitride films can be formed by low-temperature and high-speed nitriding reaction not dependent on the nitriding time or nitriding temperature. A solid dielectric is provided on at least one of opposed surfaces of a pair of electrodes opposed to each other under a pressure of 300 (Torr) or higher, a nitrogen gas containing an oxide equal to or lower than 0.2% is introduced into a space between the pair of opposed electrodes, an electric field is applied to the nitrogen gas, and the resulting N_2 (2^{nd} p.s.) or N_2 (H.I.R) active species is brought into contact with an object to be processed to form an oxynitride film/nitride film on a surface of the object to be processed.